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ABSTRACT:

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(19)



## (54) A TERMINAL SYSTEM

(71) We, VIDEOM LIMITED, a British Company of Newtown Estate, Henley-on-Thames, Oxfordshire, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a terminal system for use by airlines, travel agents and the like.

Today, each of the major airlines keeps its flight reservations on a computer and for this purpose each airline has available a large computer the memory of which contains details of every flight on every day including details of the availability of seats on each flight. As a seat is booked there is inserted in the memory of the computer the fact that a seat on a particular flight is booked and the name of the passenger. When a passenger indicates he wishes to fly by a particular flight, the computer retrieves from its memory the details of the remaining seats available on that flight. Alternatively, when a passenger wishes to know the flights available on a particular day from, for example, London Heathrow Airport to New York J.F. Kennedy Airport it is possible to retrieve from the computer information as to all the flights between those two airports on a particular day and the availability of seats on those flights. Today it is conventional to provide a large number of visual display terminal each having a keyboard and these can be operated by respective operators simultaneously. A group of visual display terminals are connected to a common terminal drive unit which is connected *via* a communication link, which may be long or short, to the computer. In practice the terminals may be at airports, city centre terminals or airline ticket sales shops and may also be at the offices of a travel agent.

The terminal drive unit has the function of driving the display of the terminals, receiving instructions from the display terminals, transmitting those instructions to the computer of the airline, receiving replies from the computer of the airline, and displaying those replies on the terminals. The computers of various airlines carry out essentially similar

tasks although they do, of course, vary in size and consequently the type of format of each instruction which an airline computer is designed to receive does not vary greatly from airline computer to airline computer but it does differ. A terminal drive unit has the function of converting an instruction (or query) as created by the keyboard operator at the visual display terminal into a format suitable for receipt by the computer of the airline and for that purpose must compose the instruction into the format required by the computer.

Difficulty arises in the office of a travel agent who normally wishes to communicate with a large number of airlines as it will be appreciated that a large number of airlines utilise the airport of a capital city, such as London. It is of course possible for the travel agent to have a separate visual display terminal for each airline or each of the major airlines, those terminals being connected to appropriate terminal drive units in turn connected to the respective airline computers. This arrangement does however have the disadvantage of substantial cost; also it is, in practice, impossible for any but the large travel agents to have more than one terminal and even the large travel agents will not normally have more than a few visual display terminals. It is of course possible for the terminal drive unit to be connected to a large number of computers and for the operator when he requires to communicate with a particular airline to designate that airline. In this case however it is necessary for the terminal drive unit to be able to convert each instruction into the appropriate format for the appropriate airline computer and to be able to carry out an appropriate conversion in the opposite direction for replies from the computers. The replies from the various computers can arrive simultaneously and in effect it is necessary to have quite a large computer within the terminal drive unit to enable simultaneous transmission and reception of messages from computers using different formats.

It is an object of this invention to provide a relatively simple terminal system suitable for use in a travel agent's office and capable

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of communicating with more than one airline computer.

According to this invention, there is provided a terminal system comprising a plurality of visual display terminals each having a keyboard, and a terminal drive unit to which the visual display terminals are connected, the terminal drive unit being intended to be connected to a plurality of airline computers and having, for each connection for an airline computer, an individual transmitting and receiving interface unit which includes a programme individual to that airline computer and a conversion means for converting messages for transmission to the respective airline computer into the appropriate format for that computer and for converting messages received from that airline computer from the format used by that computer to the extent required.

With this arrangement if the number of airline computers to which the terminal drive unit is to be connected has to be increased then it is merely necessary to increase the number of interface units for airline computers.

Preferably, the interface unit for each connection for an airline computer is divided into a transmission sub-unit and a reception sub-unit, the transmission sub-unit including an appropriate programme and conversion means and the reception sub-unit including an appropriate programme and conversion means.

Preferably, each programme is in the form of one or more programmable read only memories.

Preferably, the terminal drive unit comprises a drive unit for each terminal and an edit unit accessible by each terminal.

With this arrangement the number of terminals can be increased by increasing the number of drive units.

A terminal system according to this invention will now be described, by way of example only, with reference to the drawing of the Provisional Specification which is a block diagram of the terminal system.

Referring to the drawing, there is provided a highway 1 to which an edit card 2 and a plurality of transmit cards 3 and receive cards 4 are connected. An airline computer interface unit is made up of one transmit card 3 and one receive card 4. The highway 1 is connected through a buffer 5 to a highway 6 to which up to twenty drive cards 7 are connected.

Each drive card 7 is connected to a visual display terminal and has associated with it an address card 8. An interface unit is connected to each airline computer through a modem, a communication line, and a further modem.

Each terminal has a visual display and a keyboard.

The editing function is carried out by the

edit card 2 which performs a control supervisory function over the whole of the terminal drive unit, which includes all the components shown in the block diagram. The edit card incorporates various programmes contained in PROMS (programmable read only memories).

A drive expansion unit 9 is connected to the highway 6 and includes up to forty further drive cards 7 connected to the highway 6 through a buffer 10; several such drive expansion units 9 can be so connected.

The edit card 2 provides timing and controls the priority of access to the data highway by the transmit and receive cards 3 and 4. It also manages the data from the terminal keyboards and controls the cursor movement on each display and serves, when a message entry key on a terminal keyboard has been operated, to signal to the appropriate transmit card 3 that the message is ready to be sent.

Before an operator has typed out a message on a terminal he types a code representing the required airline and that code designates the associated transmit and receive cards 3 and 4. On depression of the appropriate message entry key the associated transmit card sees the message, converts it using its own internal PROMS and internal data processing unit and transmits it to the computer of the airline. The airline computers poll the various terminal drive units and the receive card 4 associated with each airline computer recognises the poll and controls the transmission time by the associated transmit card 3 should there be a message to transmit. Each receive card 4 receives messages from the associated airline computer, and converts them from the format of the airline to the extent required for display on the appropriate terminal. For this purpose the receive card 4 includes its own data processing unit and its own PROMS.

Each airline computer interface unit comprising one transmit card 3 and one receive card 4 is connected to the associated airline computer by a designated line and transmits and receives information to the computer under the control of the computer in a polling arrangement.

Each drive card 7 drives the video display in the associated terminal which may be adjacent or remote and may or may not include a printer. Each drive card incorporates a random access memory which stores data received from the edit, transmit and receive cards 2, 3 and 4 and contains at any time all the information currently being displayed in its associated terminal. Assuming that the terminal is a local terminal each drive card includes a store with a memory cell for each display position on the video display and the store is regularly scanned and its contents are displayed on the terminal. Where the display terminal is local two display terminals are in practice driven from the same drive card 7

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which is then essentially two drive units. In the case of a remote terminal an arrangement is provided for transmitting information between the drive card at the terminal drive unit and a local drive card adjacent to the terminal. The transmission arrangement is that only changes from the last scan are transmitted and they are transmitted at a relatively low rate.

- 10 All the PROMS are programmed on separate apparatus and are in the form of plug-in modules which may be readily replaced.

- 15 The arrangement described with an interface unit for each airline computer capable of receiving transmitting and receiving to that airline computer and effecting conversion of messages under the control of two small individual programmes and two small data processing units is in practice far cheaper than a single computer including a large memory connected to all airline computers and acting as an interface unit for all those airline computers.

- 25 The terminal system includes a.c. energised power supply units 11; each drive expansion unit 9 has its own power supply units 11.

#### WHAT WE CLAIM IS:—

1. A terminal system comprising a plurality of visual display terminals each having a keyboard, and a terminal drive unit to which the visual display terminals are connected, the terminal drive unit being intended to be connected to a plurality of airline computers and having, for each connection for an airline computer, an individual transmitting and receiving interface unit which includes a programme individual to that airline computer and a conversion means for converting messages for transmission to the respective airline

computer into the appropriate format for that computer and for converting messages received from that airline computer from the format used by that computer to the extent required.

2. A terminal system according to claim 1, wherein the interface unit for each connection for an airline computer is divided into a transmission sub-unit and a reception sub-unit, the transmission sub-unit including an appropriate programme and conversion means and the reception sub-unit including an appropriate programme and conversion means.

3. A terminal system according to claim 2, wherein each programme is in the form of one or more programmable read only memories.

4. A terminal system according to any of claims 1 to 3 wherein the terminal drive unit comprises a drive unit for each terminal and an edit unit accessible by each terminal.

5. A terminal system according to any of claims 1 to 4 wherein at least one drive unit is connected to a remote slave drive unit which is adjacent to the respective terminal.

6. A terminal system according to claim 5, wherein the transmission between the or each slave drive unit and the respective drive unit is by transmission of changes at a relatively low rate.

7. A terminal system substantially as hereinbefore described with reference to the drawing accompanying the Provisional Specification.

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